

TRANSFORMING CLINICAL CENTERS: ECOSYSTEM MANAGEMENT FOR IMPROVED EFFICIENCY

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ABSTRACT

This study defines and analyzes a medical ecosystem management model for clinical centers, focusing on theory and practical application, aiming to improve service efficiency and patient satisfaction through continuous feedback mechanisms. The growth of the healthcare market, driven by technological advancements, population aging, and increased life expectancy, demands new management strategies that integrate different areas of medical care and the clinic with the environment. The research compares the theoretical model with current processes in a real clinic, highlighting the importance of integrated digital medical records and continuous feedback systems, and identifying the lack of efficient communication among healthcare professionals as a significant barrier. The adoption of this ecosystem management model has the potential to transform the management of clinical centers, increasing operational efficiency, improving service quality, and enhancing patient satisfaction. It suggests that clinics and hospitals integrate advanced technologies and implement effective feedback systems to optimize their processes and strengthen their position in the competitive healthcare market.

Keywords: Ecosystem Management. Clinical Centers. Patient Satisfaction. Operational Efficiency.

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INTRODUCTION

The medical field is in constant development. With the increasing demand for health services and care, there has been a significant rise in investment in clinics and hospitals. Factors such as technological advancements, population aging, increased life expectancy, and heightened awareness of the importance of personal health care are driving this growth. However, this increasingly complex scenario presents significant challenges for the management of these institutions, requiring new strategies to maximize the benefits of changes in the sector and ensure excellence in services provided.

With the growth of the healthcare market, medical clinics need to adapt to keep up with and contribute to the sector's evolution. In this context, the concept of an ecosystem emerges as a link between different areas of medical care, the clinic, and the environment. To achieve effectiveness and efficiency in processes, it is essential to develop a management model capable of administering this ecosystem in an integrated and sustainable manner.

The main objective of this study is to define what a medical ecosystem management model applied in clinical centers entails, demonstrating both the theory of the model and its applicability in real clinics. The proposal is to present a model that incorporates continuous feedback mechanisms, providing more efficient health services focused on patient satisfaction. Implementing well-structured processes for scheduling, conducting, and rescheduling appointments using BPMN 2.0 notation is a central strategy of this model, aiming to improve operational efficiency and service quality in clinical centers.

A detailed analysis of the processes of scheduling, conducting, and rescheduling appointments will allow a comparison between the suggested theoretical model and the reality of a specific clinic, providing valuable insights for improving the management and operation of medical clinics. The continuous collection and integration of patient feedback are crucial components of this model, enabling strategic adjustments and continuous improvements that benefit both patient care and health outcomes.

Thus, this work not only defines a new management model for clinical centers but also offers a practical approach for its implementation, contributing to the evolution of clinic management in a scenario of increasing complexity and demand.

1 THEORETICAL FOUNDATION

In this study, the object of research is the ecosystemic medical clinic environment. Tansley defined the ecosystem in 1935 as the complex relationship of behavior between living and non-living beings with the environment, such interaction can produce integrated, participatory, and sustainable changes. The concept is multidisciplinary and applied in various contemporary studies (Byrne, 2020). In the healthcare field, the theory is applied in such a way that the ecosystem is designed to meet patient needs, connecting traditional modalities of care, tracking daily life activities, integrating home, near home, and virtual care services, leveraging support services, and supporting payment and financing (Singhal et al; 2020).

The medical market in Brazil is in constant growth and evolution, driven by a series of demographic, economic, and technological factors. In 2022, the healthcare sector represented about 9.1% of the Brazilian GDP, according to data from the Brazilian Federation of Hospitals (FBH). The growing demand for healthcare services due to the aging population is notable: the Brazilian Institute of Geography and Statistics (IBGE) projects that the elderly population will double by 2043. Additionally, the increase in the incidence of chronic diseases such as diabetes and hypertension pressures both the public and private systems to expand their capacity and improve the quality of care. The incorporation of advanced technologies, such as telemedicine, which grew by 483% in 2020 due to the COVID-19 pandemic, and artificial intelligence, is transforming medical practice, providing more accurate diagnoses and personalized treatments. Trends point to greater integration between different levels of care, promoting more holistic and patient-centered care. However, significant challenges remain, including inequality in access to health services and the need for reforms in financing and resource management. These factors indicate that the medical market in Brazil will continue to grow and adapt, seeking to balance technological innovation with accessibility and efficiency of services provided.

The article proposes a management model for decentralized clinical centers, which essentially consist of buildings that house various interconnected medical specialties but do not respond to or function as a traditional hospital. The term that describes this scenario is “Medical Office Building” (MOB).

Medical Office Buildings (MOBs) are gaining relevance in the Brazilian medical landscape. These buildings house various medical specialties in one location, facilitating patient access to different types of care without the need for a traditional hospital environment. According to a report by the Brazilian Association of Clinics (ABC), investment in MOBs grew by 15% in 2021, reflecting a trend towards the expansion of this care model in the country (ABC, 2022).

This growth is related to the search for efficiency and reduction of operational costs, as well as a response to the demand for more accessible and integrated health

services. The adoption of advanced management technologies, such as the Hospital Administration Management System (HAMT), also contributes to the popularization of MOB, improving coordination and quality of care. Studies by Santos et al. (2020) indicate that the implementation of HAMT in MOB reduces patient wait times by 20% and operational costs by 15%. The trend points to an increase in the construction and use of MOB, driven by the need for innovation and efficiency in healthcare delivery.

Regarding the term “hospital feedback,” it is possible to observe that the existing literature does not describe it ideally. According to Klopper and Lubbe (2015), feedback is a critical component in the continuous improvement of hospital services, as it allows the identification of areas of failure and success, facilitating the implementation of corrective and preventive measures. However, this study seeks to define it as not only a continuous improvement process but also a self-sustaining process in capturing leads – the patients. That is, a system where doctors, through reciprocal referrals, create a network of patients that self-replicates.

2 METODOLOGIA

This article is based on the premise that theoretical foundations are indispensable and form an essential basis for the comparison and evaluation of events. Thus, a theoretical analysis model is used in the search for empirical evidence. The study was designed through a descriptive case study to understand the phenomenon in its entirety and complexity, making it more suitable for qualitative analysis (Godoy, 1995). In qualitative research, the researcher seeks to understand the facts from the participants’ perspective, considering all relevant views to clarify aspects often invisible to external observers (Godoy, 1995).

For data collection, visits to the study site and interviews with the responsible administration were conducted. The visits provided a greater understanding and comprehension of what occurs at the study site, enabling the present analysis. Through the interviews, conducted in a limited manner with managers of the clinical center, it was possible to describe the idealization of the model, which was compared with the actual reality of the processes. These processes were observed and subsequently mapped using BPMN 2.0 language for synthesis and comprehension.

The ECO Medical Center was chosen as the object of the study because it is a highly comprehensive general clinic located in the city of Curitiba, PR, which intrinsically incorporates the ideology of the patient feedback system within the hospital. The center is classified as a Medical Office Building and offers more than 30 medical specialties, embodying the brand’s characteristic of providing everything the patient needs in a single location.

3 RESULTS ANALYSIS

3.1 SUGGESTED MODEL

Efficient management of medical appointments in specialized clinical centers is essential to ensure the quality of patient care and the optimization of clinical resources. This article presents a detailed analysis of the process of scheduling, conducting, and rescheduling appointments, using BPMN 2.0 notation to describe a model that incorporates continuous feedback mechanisms. The objective is to provide a more efficient healthcare service focused on patient satisfaction.

The implementation of a well-structured process for scheduling, conducting, and rescheduling appointments, with integrated feedback mechanisms, can significantly improve operational efficiency and the quality of care in clinical centers. This reality is depicted by Gawande (2009, p. 47), who establishes that implementing structured processes and checklists in clinical settings has been shown to significantly enhance the quality of care and patient outcomes, reducing errors, and improving efficiency.

Using BPMN 2.0 notation, this detailed model allows for a clear and precise visualization of the activities and decisions involved. Continuous feedback ensures that the patient experience is monitored and improved, resulting in higher satisfaction and better clinical outcomes. Through this, constant feedback from patients and clients can be provided, aiming for improvements that, when implemented, benefit the business model, the care provided, and consequently, patient health.

Rivera and Lee (2019, p. 142) state that efficient management of clinical centers requires robust scheduling systems and continuous feedback loops to optimize resource utilization and patient care. Furthermore, Donabedian (1980) argues that patient feedback is a fundamental component of quality assessment in healthcare, providing valuable insights into patient satisfaction and areas needing improvement.

The process begins with the patient's need to schedule a medical appointment, whether due to a health problem or for regular check-ups. This initial event is crucial to determine the demand for medical services. After the patient expresses interest in scheduling an appointment, the next step is to schedule it. In the presented model, the task of scheduling the appointment is performed by the clinical center's secretary, who checks the doctors' availability and schedules the appointment in the system. This step ensures that the patient receives timely care and that the doctor is prepared with all necessary information.

To continue the process as usual, the patient attends the clinical center and is seen by the doctor on the scheduled date. During the appointment, the doctor assesses the patient's health status, performs clinical exams if necessary, and collects detailed information to define a diagnosis. This diagnosis is reported to the patient after the consultation and must be uploaded to the clinical center's unified medical record system to ensure that the entire process is interconnected and digitized.

Additionally, the diagnosis encompasses the patient's options after the appointment, which are: the need for exams or rescheduling (which can be with the same professional or another medical specialty), or complete discharge without the need to reschedule (in which case the next activity is merely requesting feedback and closing the patient's process with the clinical center). From the conclusion of the diagnosis stage with the selection of the need for a subsequent consultation or exams with another medical specialty, it is up to the professional who conducted the appointment to indicate the clinical center and its doctors for these tasks.

Thus, the next process is carried out via the system and involves receiving a rescheduling suggestion within the clinical center for the patient through the app. If the patient accepts the suggestion, automatic rescheduling is available. In situations where the offer is not accepted, the secretary contacts the patient again to offer the service. From this task, there are three possible responses: the patient accepts the suggestion and the appointment is scheduled, restarting the cycle; the secretary does not receive a response, resulting in another contact attempt by the clinical center, with a limit of two attempts before closing the process; and the patient officially declines the rescheduling proposal, in which case the reason is asked, and the process is closed.

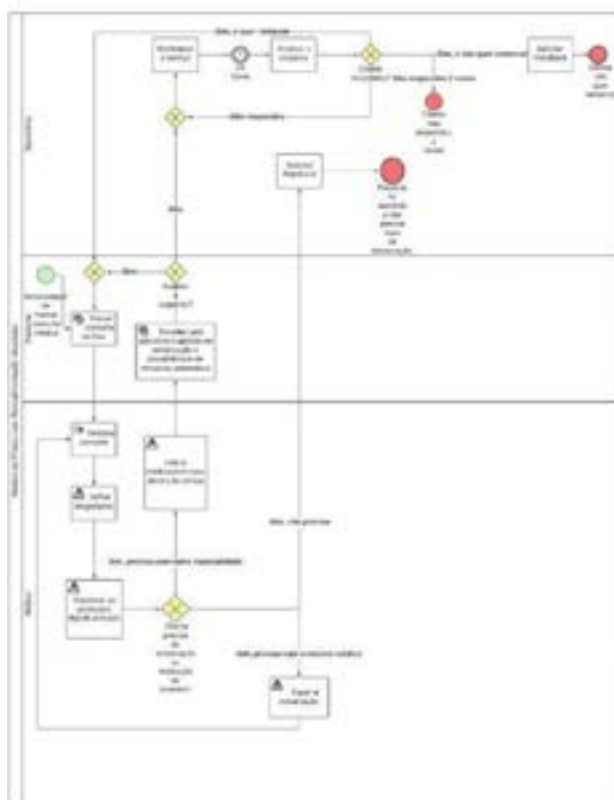
The app is an essential component in the feedback process and the suggested model, serving as the central communication hub for the patient, doctors, and clinical center. It contains unified digital medical records and the schedules of all the center's doctors. A unified medical record is understood as a section where, with the patient's approval, the center's doctors upload and describe the patient's health status, enabling future professionals who will provide care to have a deeper and quicker overview of the patient's health. Regarding doctors' schedules, all must follow and update their times in a shared calendar. Thus, when a patient needs an appointment, the system automatically indicates the nearest available time with the recommended professional and notifies the patient, allowing them to schedule their next appointment. As observed in Figure 1, the suggested model is described in a mapped manner using BPMN 2.0 notation.

3.2 ECO MODEL

This analysis presents a detailed view of the process of scheduling, conducting, and rescheduling appointments at the Eco Medical Center. The objective is to provide information on the operation of a real clinic, allowing for comparison and supporting the description of the presented ideal model.

The current process begins with the patient's need to schedule a medical appointment. The patient contacts the hospital secretary, who checks the doctors' availability and schedules the appointment in the system. On the scheduled date, the patient attends the clinic and is seen by the doctor. During the appointment, the doctor's role is to assess the patient's health status and collect information to define a correct diagnosis. After the proper medical evaluation, the doctor determines the diagnosis and outlines the necessary next steps, which may include additional tests, follow-up consultations, or referrals to other specialties.

FIGURE 1



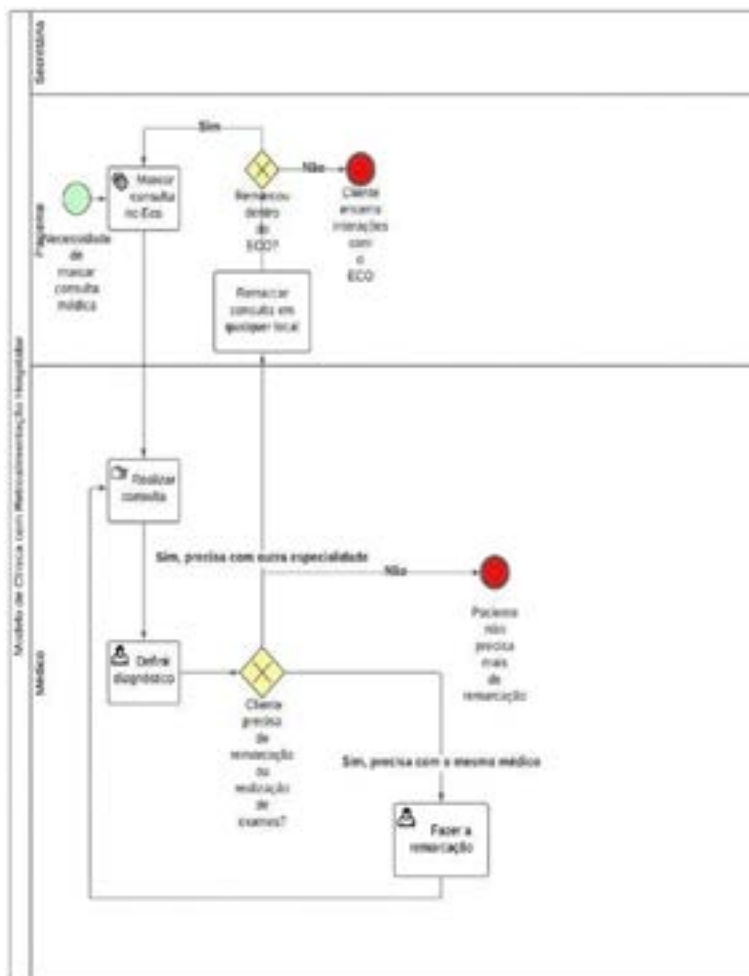
SOURCE: Authors (2024)

From this stage, the current process at Eco is divided into two possible paths, with the patient needing a new consultation or additional tests, or not. If the patient needs it, and the need is within the same specialty, the consultation is rescheduled with

the same doctor, and the process restarts. However, if it is with another specialty, the doctor refers the patient to another professional. In the current operation mode of the clinic, there is often a lack of internal referral among colleagues within the hospital, forcing the patient to seek care elsewhere. Finally, if the patient does not need a new consultation or tests, the process is closed.

If the need for rescheduling with another specialty is identified, the rescheduling process can occur within Eco or elsewhere. If the patient decides to reschedule their consultation with another doctor working within the clinic, the process starts again with the understanding secretary, scheduling the consultation on the available date. However, if the patient chooses to schedule their next consultation elsewhere, the process is closed, and the patient no longer interacts with Eco until a new consultation need arises. Figure 2 illustrates the described process mapped using BPMN 2.0 notation.

FIGURE 2



SOURCE: Authors (2024)

3.3 COMPARISON

From the mapping, description, and analysis of the suggested model and the actual processes at Eco Medical Center, it becomes possible to compare the models. It can be observed that, up to the diagnosis definition stage, the two models are identical. The differentiation begins with the need to link the diagnosis to the patient's digital medical record. This situation is idealized by Eco, but its collaborators do not follow it in their daily consultations. The suggested model, on the other hand, makes it a rule to update the unified digital medical record, ensuring that, respecting medical ethical standards, information integration is possible to continuously improve patient care.

Argwal and Khandpur (2021) argue that the integration of telemedicine and digital feedback systems has revolutionized patient follow-up care, enabling real-time monitoring and immediate feedback to enhance patient management. It is understood, then, that the fusion of medicine with technology provides potential improvements in patient care and health monitoring, as it allows all doctors to view their current health status and previous consultations. Thus, updating the unified medical record is defined as an essential step in the suggested model.

The next stage where the models diverge is in the rescheduling of consultations. Even in scenarios where rescheduling is not necessary, Eco's current model does not request patient feedback on their consultations, an essential step for the continuous improvement cycle. In addition to the previously mentioned benefits to patient health and continuous care, for a business model to flow in a way that enables its evolution, constant feedback collection from its clients is necessary. Anthony and Govindarajan (2007, p. 112) state that feedback systems in business environments are crucial for performance evaluation and strategic adjustments, ensuring that organizations remain aligned with their goals and responsive to market changes.

In this same stage, the only situation where the processes converge is when the need for rescheduling is with the same doctor from the conducted consultation, as this is the standard process in most current models. However, when the need for rescheduling is for an exam or different professional, the greatest divergence between the suggested model and Eco Medical Center's reality is presented. In the suggested model, the doctor must refer a colleague within the same clinical center if at least one of them meets the patient's needs.

This step is essential for the feedback model to work, as a referral from a doctor previously known to the patient is crucial for better acceptance of another professional's suggestion. According to Festinger (1957, p. 29) cognitive dissonance theory explains why patients are more likely to follow medical advice when they perceive the advice as

coming from a consistent and reliable source, reducing the dissonance between their beliefs and actions. It is understood that a referral from the patient's already known doctor tends to result in a higher probability of the patient following the advice than if only the clinical center's secretary suggested.

It is noted that although the ideology of the studied clinical center involves this step, its reality is different, as the doctors do not have a structured integration, leading them not to refer their clinic colleagues. This situation points to another need within the suggested model: good communication among the center's doctors, both with each other and with patients. Halvorson and Higgins (2013) highlight that effective communication strategies, including timely and constructive feedback, are critical in healthcare settings to ensure patient understanding and compliance with medical advice.

The suggested model includes, after the consultation where rescheduling with another professional is needed, a series of actions to be taken—a situation not effectively practiced at Eco, according to the analysis. It is suggested that a system be programmed to send automatic messages to the patient via the app, reminding them of their need to reschedule the consultation, reinforcing the suggestion made in person by the doctor. If the client agrees with the rescheduling, they can accept it directly in the app, generating automatic rescheduling. If the client does not accept the suggestion, the final "loyalty" attempt should be made by the center's secretary, who should contact the patient.

This situation essentially results in two possible final outcomes: maintaining the client—the ideal case where the efforts made are converted into the desired feedback—or closing the client's processes with the center—in which case the patient's feedback is collected, expressing their reason for not continuing with the center's services, which should be used for improvements. This scenario is not present in the realistic scenario of Eco Medical Center, even though it is essential for maximizing the feedback effectiveness attempts.

FINAL CONSIDERATIONS

This research defined and analyzed an ecosystemic medical management model for clinical centers, demonstrating its theory and practical application. The model aims to provide more efficient healthcare focused on patient satisfaction through continuous feedback mechanisms. Furthermore, the growth of the healthcare market is driven by technological advancements, an aging population, increased life expectancy, and greater awareness of personal health importance. In this context, the ecosystem concept is essential, connecting medical care areas, the clinic, and the environment.

Comparing the theoretical model with the processes at the Eco Medical Center, it was observed that both are similar up to the diagnosis definition. However, the proposed model differs in the need to integrate the diagnosis into the digital medical record and collect patient feedback, which is not adequately done by the Eco Medical Center. The lack of efficient communication between doctors and the absence of a structured internal referral system are critical points in the current model. The proposed model includes the continuous updating of digital medical records and the implementation of feedback systems to enhance services.

The implementation of the ecosystemic medical management model can transform the management of clinical centers, increasing operational efficiency, improving the quality of care, and raising patient satisfaction. Clinics and hospitals should consider integrating advanced technologies, updating digital medical records, and continuously collecting feedback to optimize their processes.

This study offers a viable and well-founded model for the management of clinical centers, contributing to the evolution of management in a scenario of increasing complexity and demand. Future research can explore the application of the model in different clinical contexts and evaluate its long-term impact on the quality of care and the sustainability of healthcare services.

One of the final considerations is the necessity for healthcare institutions to embrace integrated digital medical records and continuous feedback mechanisms. These components are crucial for enhancing communication among healthcare professionals, which is currently identified as a significant barrier. By adopting such a model, clinical centers can potentially increase their operational efficiency and improve the overall quality of services provided to patients. This improvement is not merely operational but also translates into higher patient satisfaction, which is a critical metric in the healthcare industry.

Furthermore, the research underscores the importance of integrating advanced technologies within the healthcare ecosystem. As the healthcare market continues to expand due to technological advancements, population aging, and increased life expectancy, there is a growing need for innovative management strategies. The inferences drawn from the study suggest that clinics and hospitals that implement effective feedback systems and advanced technologies will be better positioned to compete in the rapidly evolving healthcare market. This strategic integration could lead to a transformation in how clinical centers are managed, ultimately leading to a more efficient, quality-driven, and patient-centric healthcare system.

Another critical consideration highlighted by the abstract is the challenge faced by doctors and professional administrators in reconciling the business aspects of medical care with the core ethical principles of the profession. Understanding medical care as a business necessitates viewing patients as clients who demand high-quality service, efficient processes, and satisfactory outcomes. This perspective can be difficult for healthcare professionals to adopt, as it seems to conflict with the traditional ethos of prioritizing patient welfare above all else. However, the adoption of a medical ecosystem management model, as discussed in the study, provides a framework that can help bridge this gap. By integrating advanced technologies and continuous feedback mechanisms, healthcare providers can enhance service delivery without compromising their professional ethics. The model emphasizes that improving operational efficiency and patient satisfaction are not mutually exclusive with maintaining high ethical standards. Instead, they are complementary goals that, when achieved together, can lead to a more effective and ethical healthcare system.

Effective communication within hospitals and between healthcare professionals is notoriously challenging, often due to hierarchical structures, busy schedules, and varying levels of technological adoption. This difficulty in communication can lead to fragmented information sharing, which hampers the ability to provide coordinated and comprehensive care. Moreover, this communication gap extends to interactions with academic institutions. Hospitals often miss out on valuable insights and innovative research findings that could be applied to improve clinical practices.

The lack of efficient channels for exchanging information and ideas means that opportunities for collaboration and continuous improvement are frequently lost. By failing to leverage the latest academic advancements, hospitals not only compromise their operational efficiency but also miss the chance to enhance patient care through evidence-based practices and cutting-edge innovations. Addressing these communication barriers is essential for fostering a more dynamic and responsive healthcare environment that benefits from the symbiotic relationship between clinical practice and academic research.

Future studies in the field of medical ecosystem management should explore several key areas to build on the findings of this article. Firstly, research could focus on developing and testing specific technological tools that facilitate seamless communication and information sharing among healthcare professionals. Additionally, longitudinal studies could assess the long-term impacts of integrated digital medical records and continuous feedback systems on patient outcomes and operational efficiency. Investigating the scalability of such models in different types and sizes of healthcare institutions would provide valuable insights into their broader applicability.

Furthermore, interdisciplinary studies that combine insights from healthcare management, technology, and ethics could offer a more holistic understanding of how to balance business efficiency with patient-centered care. Finally, collaborative research involving academic institutions and clinical centers could foster innovation and ensure that the latest advancements in medical care are rapidly and effectively translated into practice. These future studies would not only validate the proposed model but also drive continuous improvement in the healthcare ecosystem.

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